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| 10/805,338 | 03/22/2004 | Shin-ichi Nishizono | 1075.1254 | 8996 |

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| EXAMINER | |
|---|---|
| LEE, CHUN KUAN | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/805,338 | NISHIZONO ET AL. | |
| | Examiner | Art Unit | |
| | Chun-Kuan (Mike) Lee | 2181 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *16 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

## RESPONSE TO ARGUMENTS

1. Applicant's arguments filed 11/16/2007 have been fully considered but they are not persuasive. Currently, claims 1-28 are pending for examination.

2. In response to applicant's arguments, on page 11, last paragraph to page 12, 2nd paragraph, regarding the amended independent claims 1, 10, 19 and 28 rejected under 35 U.S.C. 103(a) that the combination of references does not teach/suggest the amended claim limitation of "controlling means ... for controlling resumption of said I/O process in either a first system ... and a second system ... " because AAPA discloses a conventional system which exclusively operates in only one system and Coates' data buffer is silent on "controlling means ... for controlling resumption of said I/O process;" applicant's arguments have fully been considered, but are not found to be persuasive.

Please note that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The examiner relied on the references as following for the teaching of the above claimed limitation:

AAPA teaches a control means ... for controlling resumption of said I/O process in either a first system ... or a second system ... (Specification, p. 5, ll. 5-16; page 7, ll. 5-26 and p. 9, ll. 5-16), wherein the first system have a lower data transmission rate by

transmitting the requests one by one, and the second system have a high data transmission rate by concurrent transmitting of requests.

Coates teaches a control mean (e.g. control the data flow) for I/O data transmission for a first system (e.g. reduced transmission rate) (Fig. 5, ref. 540) and a second system (e.g. increased transmission rate) (Fig. 5, ref. 520) (Fig. 5), wherein the control mean control the flow of data as data is transferred at the reduced transmission rate and the increased transmission rate.

The resulting combination of Coates with AAPA would teach the control means ... for controlling resumption of said I/O process in either the first system ... and a second system ... .

3. In response to applicant's arguments, on page 12, last paragraph to page 15, 1st paragraph, regarding the amended independent claims 1, 10, 19 and 28 rejected under 35 U.S.C. 103(a) that the combination of references does not teach/suggest the claim limitation "a reconnection queue for enqueuing control blocks storing reconnection information on one or more input/output requests among input/output requests from said channels of said host" because AAPA merely teaches the sending of a I/O request and that there may be more than one I/O request waiting for reconnection, therefore there is not apparent need for "enqueuing control blocks storing reconnection information" in the conventional system; applicant's arguments have fully been considered, but are not found to be persuasive.

As AAPA teaches the that there may be more than one I/O request waiting for reconnection (Specification, page 9, ll. 5-16), wherein each I/O request would also have the corresponding control blocks having information that control the reconnection to the host, such as the control information that controls the issuing of reconnection request to another path when the reconnection with a first path fails or the control information that controls which corresponding path(s) the reconnection request(s) would be issued (Specification, page 7, ll. 5-26). Therefore, there is a need that the control blocks are enqueued along with the enqueued I/O request for implementing the reconnection to the host.

4. In response to applicant's arguments, on page 13, last paragraph, regarding the amended independent claims 1, 10, 19 and 28 rejected under 35 U.S.C. 103(a) that there is not evidence that one skill in the art would modify the convention systems; applicant's arguments have fully been considered, but are not found to be persuasive.

AAPA teaches the enqueuing of the I/O requests and the corresponding enqueued control blocks (AAPA, Specification, page 9, ll. 5-16) in the convention systems, and Coates teaches the regulation of a queue by dynamically switching between two systems, wherein the two systems comprise a system operating at an increased transmission rate and a system operating at a reduced transmission rate (Coates, Fig. 5).

Therefore, by combining Coates with AAPA, AAPA is modified to enable regulation of the enqueued I/O requests and the corresponding enqueued control blocks

by dynamically switching between the first system (e.g. the first system have a lower data transmission rate by transmitting the requests one by one) and the second system (e.g. the second system have a high data transmission rate by concurrent transmitting of requests) for the benefit of implementing a robust flow control ensuring the queue does not become full (congested) or empty (starved).

5. In response to applicant's arguments, on page 15, 2nd paragraph to last paragraph, regarding the amended independent claims 1, 10, 19 and 28 rejected under 35 U.S.C. 103(a) that the combination of references does not teach/suggest the claimed limitation of "dynamically switching the system ... according to the number of the enqueued control blocks," because AAPA does not teach the claimed "control blocks;" applicant's arguments have fully been considered, but are not found to be persuasive.

Please note that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

As discussed in detail above, AAPA does teach the claimed "control blocks," therefore the combination of reference does teach the claimed "dynamically switching the system ... according to the number of the enqueued control blocks" as following:

AAPA teaches the number of the enqueued control blocks, as discussed in detail above.

Coates teaches the dynamically switching of the system according to the number of enqueued data (e.g. control blocks) (Fig. 5; col. 3, ll. 36-50 and col. 11, ll. 21-32), wherein base on the number of data buffered, the fullness of the buffer is determined, and base on the fullness of the buffer, the system is dynamically switched (e.g. switching between the system operating at higher transmission rate and the system operating at lower transmission rate).

By combining Coates with AAPA, the resulting combination of the references teaches dynamically switching the system according to the number of the enqueued control blocks (i.e. data).

## I. REJECTIONS BASED ON PRIOR ART

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-2, 9-11, 18-20 and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Coates et al. (US Patent 6,694,389).

7. As per claims 1, 10, 19 and 28, AAPA teach a storage apparatus and a reconnection controlling method comprising:

a physical device (Drawings, Fig. 6, ref. 2a); and

a storage controlling apparatus (i.e. controller) (Drawings, Fig. 6, ref. 3) disposed between said physical device and a host (Drawings, Fig. 6, ref. 4) to control an access from said host to said physical device (Specification, page 1, l. 22 to page 2, l. 2);

said storage controlling apparatus comprising:

one or more host interface modules (Drawings, Fig. 6, ref. 20), connected to a plurality of channels (Drawings, Fig. 6, ref. 50) of said host through a plurality of paths belonging to the same path group, for controlling an interface with said host (Specification, page 2, ll. 17-19);

a management module (Drawings, Fig. 6, ref. 20) for generally managing the whole of said storage controlling apparatus (Specification, page 2, ll. 20-21);

said management module comprising:

a reconnection queue for enqueuing control blocks storing reconnection information on one or more input/output requests among input/output requests from said channels of said host (Specification, p. 5, ll. 5-16 and p. 9, ll. 5-16), wherein the enqueued I/O requests are issued for reconnection and each I/O request is controlled and regulated in order to obtain reconnection success; therefore, there it would be obvious to include the queue of control blocks with reconnection information associated with the queue of I/O requests waiting for reconnection; and

a controlling mean, when an I/O process corresponding to one of said one or more control blocks managed in said reconnection queue is resumed, for controlling resumption of said I/O process in either

a first system of issuing a reconnection request to each of said paths belonging to the same path group one by one through said host interface module and requesting said host interface module to perform said I/O process using a path first successful in reconnection at the point of time that the reconnection succeeds (Specification, page 7, ll. 5-16), wherein the implementation of the first system would result in the lower transmission rate as the requesting is implemented one by one, or

a second system of issuing concurrently or almost concurrently the reconnection request to said plural paths belonging to the same path group through said one or more host interface modules and requesting said host interface module to perform said I/O process using a path which first succeeds in the reconnection (Specification, page 7, ll. 17-26), wherein the implementation of the second system would result in the higher transmission rate as the requesting may be implemented to more than one host interface module, and further more, there must be the controlling mean in order to properly operate in either the first system or the second system.

AAPA does not expressly teach the storage apparatus and the reconnection controlling method comprising wherein said management module comprising:

the control means for the first system and the second system;

a monitoring means for monitoring the number of said enqueued control blocks in said reconnection queue; and

a switching means for dynamically switching the system to be executed by said controlling means to either said first system or said second system according to the number of the enqueued control blocks monitored by said monitoring means.

Coates teaches a method and a apparatus for data flow control comprising:

determining the occupancy (e.g. fullness) of a buffer by counting the number of sub-buffers in a steady state of starvation and congestion (col. 11, ll. 21-32); and

determining if the fullness of the buffer is above an upper threshold (Fig. 5, ref. 500 and col. 3, ll. 36-50);

signaling the receiver regarding the increase of transmission rate if the fullness of the buffer is above said upper threshold (Fig. 5, ref. 520 and col. 3, ll. 36-50), therefore there would be an increase in the amount of data transferred from the buffer to the receiver;

determining if the fullness of the buffer is below an lower threshold (Fig. 5, ref. 530 and col. 3, ll. 36-50);

signaling the receiver regarding the reduction of transmission rate if the fullness of the buffer is below said lower threshold (Fig. 5, ref. 540 and col. 3, ll. 36-50), therefore there would be a reduction in the amount of data transferred from the buffer to

the receiver, wherein the data flow control enables the switching between operating at transferring the increased amount of data and operating at transferring the reduced amount of data.

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Coates's buffer flow control into AAPA's management module's queuing of the requests for the benefit of implementing a robust flow control ensuring the buffer does not become full (congested) or empty (starved) during transmission of data (Coates, col. 1, ll. 11-24) to obtain the invention as specified in claims 1, 10, 19 and 28. The resulting combination of the references teaches the storage apparatus and the reconnection controlling method further comprising:

monitoring by determining the fullness of the buffer enqueuing the control blocks on one or more input/output requests by counting the number of the euqueued control blocks;

determining if the number of control blocks in the reconnection queue is greater than the limitation, and if it is determined to be greater, more requests would be transferred (increasing the amount of requests from the buffer to the receiver), therefore would operate the control mean for the second system (i.e. scattering mode) as multiple requests are concurrently issued and transferred from the buffer to the receiver (e.g. host);

determining if the number of control blocks in the reconnection queue is lesser than the limitation, and if it is determined to be lesser, less request would be transferred (reducing the amount of requests from the buffer to the receiver), therefore operating

the control mean for the first system (i.e. one path mode) as requests are issued and transferred one at a time from the buffer to the receiver; and

switching between operating at the second system (e.g. transferring more requests) and operating at the first system (e.g. transferring lesser requests) base on the fullness of the reconnection queue, therefore, the control means would operate in either the first system or the second system.

8. As per claims 2, 11 and 20, AAPA and Coates teach all the limitations of claims 1, 10 and 19 as discussed above, where Coates further teaches the storage apparatus and the reconnection controlling method comprising:

wherein when said the number of the enqueued control blocks monitored by said monitoring means is not larger than a predetermined number (Fig. 5, ref. 530), said switching means switches the system to be executed by said controlling means to said first system (Fig. 5, ref. 540), and

when the number of the enqueued control blocks monitored by said monitoring means exceeds said predetermined number (Fig. 5, ref. 500), said switching means switches the system to be executed by said controlling means to said second system (Fig. 5, ref. 520).

9. As per claims 9, 18 and 27, AAPA and Coates teach all the limitations of claims 1, 10 and 19 as discussed above, where AAPA further teaches the storage apparatus and the reconnection controlling method comprising wherein when said second system

is executed, said controlling means successively requests the second and later paths which succeed in the reconnection to perform the I/O processes corresponding to one ore more control blocks which can be reconnected among said control blocks managed in said reconnection queue (AAPA, Specification, page 7, l. 17 to page 9, l. 1).

10. Claims 3-8, 12-17 and 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) and Coates et al. (US Patent 6,694,389), and further in view of Mizuno (US Patent 6,922,743).

AAPA and Coates teach all the limitations of claims 1, 10 and 19 as discussed above, but AAPA and Coates does not teach the storage apparatus and the reconnection controlling method further comprising:

wherein said management module further comprises a management table for managing a use status of each of said paths through said one or more host interface modules; and

when either said first system or said second system is executed, said controlling means refers to said management table to issue the reconnection request to the corresponding paths set free in said management table through said host interface module.

Mizuno teaches a system and a method comprising:

a controller (Fig. 5, ref. 530) comprising a cross-call administration table (Fig. 5, ref. 540); and

wherein the cross-call administration table provides the status of a port (e.g. ready flag) that a I/O path is connected to (Fig. 8, ref. 825, 835), and further more, the cross-call administration table is read out to determine which of the channel control processors (Fig. 5, ref. 505) controlling the ports are not busy in order to carry out the reconnection process (col. 9, ll. 13-26).

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Mizuno's cross-call administration table and the corresponding ready flag into AAPA and Coates's management module for the benefit of increasing the data throughput to the host as the response to the host's request can be made rapidly (Mizuno, col. 4, ll. 39-43) to obtain the invention as specified in claims 3-8, 12-17 and 21-26. The resulting combination of the references teaches the storage apparatus and the reconnection controlling method further comprising:

the management module comprises the cross-call administration table with the ready flag; and

when operating in either the first system or the second system, the control mean reads out the cross-call administration table in order to determine, through the host interface module (e.g. channel control processors), which of the I/O path is not busy to implement the reconnection process.

## II. CLOSING COMMENTS

***Conclusion***

### a. STATUS OF CLAIMS IN THE APPLICATION

The following is a summary of the treatment and status of all claims in the application as recommended by **M.P.E.P. 707.07(i)**:

#### a(1) CLAIMS REJECTED IN THE APPLICATION

Per the instant office action, claims 1-28 have received a final action on the merits. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### b. DIRECTION OF FUTURE CORRESPONDENCES

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chun-Kuan (Mike) Lee whose telephone number is (571) 272-0671. The examiner can normally be reached on 8AM to 5PM.

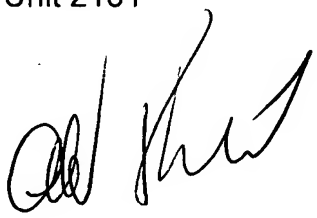
## IMPORTANT NOTE

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alford Kindred can be reached on (571) 272-4037. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

December 18, 2007

Chun-Kuan (Mike) Lee
Examiner
Art Unit 2181



ALFORD KINDRED
SUPERVISORY PATENT EXAMINER